

Working group 1: Electron and Ion Desorption

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Low Energy

- AGS Booster
- SIS18
- LEIR



High Energy

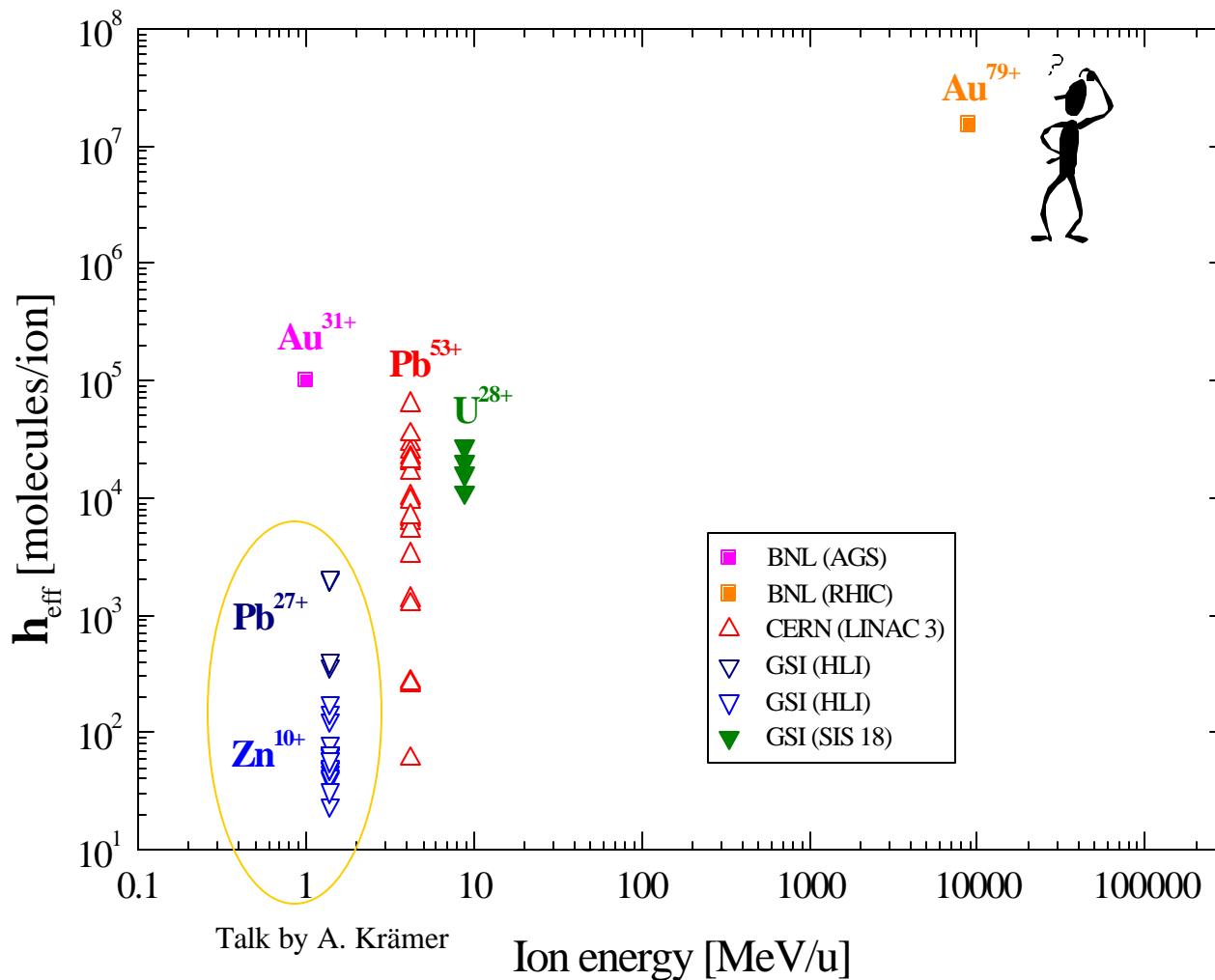
- RHIC
- SPS
- LHC

➤ SIS100/300

- Loss due to charge exchange
- Well defined loss angles (mrad)

- Loss due to nuclear scattering
- Grazing loss angles (<<mrad)

Heavy-ion induced desorption data: Overview



Pressure Rise Observations

Accelerators				Experimental setups					
	E [MeV/u]	Ion	Target		E [MeV/u]	Ion	Target		
BNL Booster	1-100	Au31+	valve chamber wall	BNL Tandem	1	Au31+	chamber wall		observed running starting possible
BNL RHIC	8900	Au79+	valve, chamber wall samples (see proposal)						
CERN LEAR	4.2	Pb54+	chamber wall	CERN LINAC3 CERN SPS	4.2 158000	Pb27+/53+ In49+	chamber wall collimator		
GSI SIS	10 to 100	p to U28+	chamber wall scraper chamber wall	GSI HLI GSI UNILAC GSI SIS18	1.4 2 to 11 10 to 1000	C,Pb,Cr, Zn p to U p to U	samples to define to define		
LBNL					0.025	K+	samples		
TSI				Uppsala	<46	Ne, Ar, Xe	to define		
The Svedberg Lab.									

→ There is a wide range of parameters: energy, ion + charge, impact angle, temperature, base pressure, future requirements on the machines,.....

→ Resulting in yields of 10^2 to 10^7 desorbed molecules per lost ion

What has to be done & Open Questions

- **Theory aspects of ion beam induced desorption:**
 - Applied Surface Physics: could / would they help ?
 - Is it a surface or a bulk effect ?
 - Measure well defined sample
 - Understand the physics
- **What has to be done in future experiments?**
 - NEG desorption measurements with heavy ions
 - Cold surface: mounted samples on cold-head (first step)
 - Electron detection: How do secondary electrons contribute ?
- **Instrumentation for experiments (machine and test benches):**
 - One has to know: pumping speed, chamber volume, number of lost ions, impact angle, ...
 - Use calibrated instruments: Ion Gauge, RGA
 - Benchmark experiments for reliable comparison

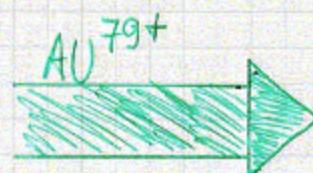
→ Closing the gap of missing data from MeV/u to GeV/u

Proposed RHIC Single-Pass Experiment

Bakeable system (300°C)
with known pumping speed!

Beam Monitor 1
Intensity / Position

B.A.G. R.G.A.



$\varnothing 130\text{ mm}$ (RHIC)

e⁻ detector

Proposed Desorption Experiment
in RHIC (warm sector)

Graphite (no sample on)

e⁻ detector

Beam Monitor 2
Intensity / Position

Ti₂V/st.st.